Physics B.S. Curriculum for Students Entering from 2015

MCS First Year Core

These introductory courses must be completed during the first year, with the exception that one of the first two courses may be delayed.

- 03-121: Modern Biology
- 09-105: Introduction to Modern Chemistry I
- 21-120: Differential and Integral Calculus
- 21-122: Integration, Diff. Eq., and Approx.
- 38-101: EUREKA: Discovery & Its Impact
- 76-101: Interpretation and Argument
- 99-101 / -102 / -103: Computing @ CMU

MCS Upperclass Core

These courses provide non-technical breadth, both in and out of the classroom. Permissible electives are listed in the MCS course catalog.

- 38-110: Engage in Service
- 38-220: Engage in the Arts
- 38-230: Engage in Wellness: Inward
- 38-301: MCS Junior Seminar
- 38-330: Engage in Wellness: Outward
- 38-430: Engage in Wellness: Forward
- Cultural/Global Understanding Elective
- Non-Technical Elective
- Non-Technical Elective
- Non-Technical Elective
- Non-Technical Elective

Physics Core

All Physics majors take these Physics and Mathematics courses to prepare for individualized tracks of study, including four colloquium courses.

- 33-121: Physics I for Science Students
33-151: Matter and Interactions I
- 33-142: Physics II for Eng. or Physics
33-152: Matter and Interactions II
- 33-104: Experimental Physics
- 15-110: Principles of Computing
15-112: Fund. of Computing & CS
- 33-201: Physics Sophomore Colloquium I
- 33-211: Physics III: Modern Essentials
- 33-231: Physical Analysis
- 33-202: Physics Sophomore Colloquium II
- 33-228: Electronics I
- 33-232: Mathematical Methods of Physics
- 33-234: Quantum Physics
- 21-259: Calculus in Three Dimensions
- 33-301: Physics Upperclass Colloquium I
- 33-331: Physical Mechanics I
- 33-338: Int. Electricity and Magnetism I
- 33-341: Thermal Physics I
- 33-302: Physics Upperclass Colloquium II
- 33-340: Modern Physics Laboratory

Track

These Physics, Mathematics, Technical, and Free electives determine your track. The following pages have overviews of each track.

- Physics Breadth Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Note: Free electives are to satisfy the 360 unit requirement.

Key

- : Required Course
- : Select One Course
- : Any Course

Physics Major Tracks, Page 1

Graduate School Preparation

Regardless of track, Physics majors planning to undertake graduate studies are strongly advised to take the following four courses.

- 33-332: Physical Mechanics II
- 33-339: Intermed. Electricity & Magnetism II
- 33-445: Advanced Quantum Physics I
- 33-446: Advanced Quantum Physics II

Note: These courses may be used as Qualifying Physics, Technical, or Free Electives.

No Track

Physics students wanting maximum freedom can opt not to select a track. While there is significant flexibility, there are breadth requirements.

- Physics Breadth Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Qualifying Physics Elective
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Applied Physics Track

Students aiming for a career path in industrial or governmental laboratories can take this track to enhance computing and laboratory skills.

- 33-448: Introduction to Solid State Physics
- Computational Science Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- Applied Physics or Laboratory Elective
- 33-350: Undergraduate Research 33-451: Senior Research related to applied physics
- Mathematics Elective
- Free Elective
- Free Elective
- Free Elective

Astrophysics Track

Students planning careers or postgraduate work in astronomy or astrophysics can follow this track to gain a strong background in the field.

- 33-224: Stars, Galaxies and the Universe
- 33-466: Extragalactic Astrophysics and Cosmology
- 33-467: Astrophysics of Stars and the Galaxy
- 33-350: Undergraduate Research 33-451: Senior Research related to astrophysics
- Mathematics Elective
- Technical Elective
- Technical Elective
- Technical Elective
- Free Elective
- Free Elective
- Free Elective

Key

- : Required Course
- : Select One Course
- : Recommended Course
- : Any Course

Physics Major Tracks, Page 2

Graduate School Preparation
Regardless of track, Physics majors planning to undertake graduate studies are strongly advised to take the following four courses.

- 33-332: Physical Mechanics II
- 33-339: Intermed. Electricity & Magnetism II
- 33-445: Advanced Quantum Physics I
- 33-446: Advanced Quantum Physics II

Note: These courses may be used as Qualifying Physics, Technical, or Free Electives.

Biological Physics Track
Students preparing for careers in biological or medical physics or graduate work in biophysics can broaden their major with this track.

- 33-441: Introduction to Biophysics
- Qualifying Physics Elective
- Mathematics Elective
- 03-231: Biochemistry I
- 09-217: Organic Chemistry I
- 09-218: Organic Chemistry II
- Biological Sciences Elective
- Biological Sciences Elective
- Free Elective
- Free Elective
- Free Elective

Chemical Physics
Students planning graduate studies with an emphasis on chemical physics or a health profession may be interested in this track.

- Physics Breadth Elective
- Mathematics Elective
- 09-106: Modern Chemistry II
- 09-344: Physical Chemistry (Quantum)
- 09-345: Physical Chemistry (Thermo)
- Chemistry Elective
- Chemistry Elective
- Chemistry Elective
- Free Elective
- Free Elective
- Free Elective

Computational Physics Track
Students can strengthen their grounding in the foundations and practice of computer use as applied to scientific problems with this track.

- 33-241: Introduction to Computational Physics
- 33-456: Advanced Computational Physics
- Physics Breadth Elective
- Qualifying Physics Elective
- 21-127: Concepts of Mathematics
- 21-369: Numerical Methods
- 15-122: Principles of Imperative Computation
- 15-150: Functional Programming
- Free Elective
- Free Elective
- Free Elective

Key

- : Required Course
- : Select One Course
- : Recommended Course
- : Any Course